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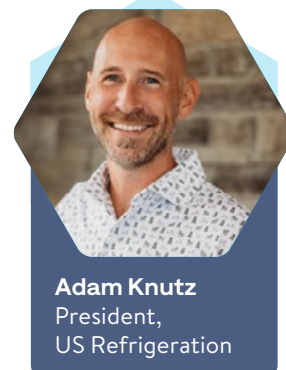
Insights for sustainable success in
the mechanical services industry



The Arcticom
Group®

CO₂ and Low GWP Migration: It's Time to Train!

Changes in allowable GWP refrigerants impact consulting engineers, HVACR technicians, and local and national companies. With the demand for CO₂-trained workers on a rapid rise, understanding industry changes and how to meet them is imperative for all three groups.



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Following governmental and consumer demands for more eco-friendly systems, refrigeration equipment manufacturers, installers, and technicians are setting their sights on low GWP refrigerants. While refrigeration sustainability initiatives have been a conversation for decades, recent pushes both in legislation and in consumer preferences make implementation in major supermarkets, convenience stores, restaurants, and other businesses a sky-high priority.

What Is GWP?

GWP stands for “[global warming potential](#).” This metric measures how much energy the emissions of 1 ton of a given greenhouse gas (GHG) will absorb compared to the absorption rate of 1 ton of carbon dioxide (CO₂) during a set period. Gases with a higher GWP (that is, gas that traps more heat than CO₂) increase the greenhouse effect even further.

Traditional refrigerants trap substantially more heat than CO₂, often putting their numeric GWP value in the thousands or tens of thousands. Because CO₂ is the reference benchmark for measuring the metric, its value is always one, making it an obvious lower-GWP alternative.

Which Higher GWP Refrigerants Were Traditionally Used and Why?

Conventional methods of refrigeration include the gases freon and R-410A (Puron). Used for their ideal cooling capacity, stability, and easy compatibility with existing equipment, these gases were once considered superior refrigeration options. However, because of their [high GWP values](#), new regulations call for quickly phasing out formerly popular refrigerants such as the following:

- » **R-12 and R-22:** Used in home HVAC systems
- » **R-404A:** Used in supermarket systems for commercial refrigeration
- » **R-410A:** Used in residential and commercial air conditioning systems as a common replacement for R-22
- » **R-507A:** Used in medium to low-temperature refrigeration equipment as a common replacement for R-22



What Are the Benefits of Low GWP Refrigerants?

The positive environmental benefits of low GWP refrigerants are just the beginning. Technicians and businesses can benefit from incorporating more sustainable options into their equipment.

Lowering Negative Environmental Impacts

The most obvious benefit is the main reason behind the shift: reducing the commercial and industrial sectors' immense negative contributions to global warming. By using alternatives like CO₂, companies can minimize their greenhouse gas emissions and become more eco-friendly.

Meeting Sustainability Goals

Businesses can see a significant boost in their sustainability initiatives by using low GWP refrigerants, helping them reach emissions goals faster. In certain applications, CO₂ can even be more energy efficient than traditional options, saving companies on operational costs.

Complying With Changing Regulations

Legislators are making significant moves toward more sustainable refrigeration options at both the state and federal levels. As of 2024, 12 states have imposed GWP limits on refrigerants. On the national level, the [American Innovation and Manufacturing \(AIM\) Act of 2020](#) and the [Environmental Protection Agency's \(EPA's\) Final Rule](#) on the topic are regulating the transition to low GWP refrigerants.

Making considerable changes to legacy systems sooner rather than later will help businesses stay compliant and avoid fines and penalties. Waiting until the last minute may mean missing deadlines due to low technician and parts availability or holdups from complications during replacement.

Following Trends in Demand

Consumer trends have been leaning toward patronizing more eco-friendly businesses for years. Lower GWP refrigerants enhance a company's sustainable and socially responsible image in the eyes of customers.

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Which Refrigerants Have the Lowest GWP?

Engineers, technicians, and businesses are busy swapping out high GWP refrigerants for the lowest available GWP alternatives. These include CO₂ and other common gases alongside newer synthetic options.

While low GWP refrigerants are better for environmental concerns, many of these gases come with their own challenges. For example, when using common options like ammonia and propane, technicians and end users must contend with their increased flammability.

Many typical applications are increasingly using the following refrigerants in place of traditional high GWP gases:

- » **R-32:** Used in air conditioning systems as a low GWP replacement for R-410A
- » **R-1234yf:** Used in the automotive industry
- » **Carbon dioxide (also referred to as R-744):** Used in both refrigerators and HVAC systems
- » **Ammonia:** Used in large-scale industrial refrigeration and HVAC systems
- » **Hydrocarbons (for example, R-290, R-600a, and R-1270):** Used in newer refrigerator models and some HVAC systems



What Are the Benefits of Using CO₂ as a Refrigerant?

With superior thermo-dynamic qualities and none of the challenges of synthetic options, CO₂ rises above many alternatives as a high-value, low-GWP refrigerant.

Saving on Installation

An all-CO₂ refrigeration system costs less to install than other options in two ways. First, installations can use smaller copper pipes to convey the gas, saving material costs. Second, the smaller lines make for a quicker and easier installation, reducing labor costs.

Lowering Operating Costs

CO₂ refrigeration requires higher pressure than alternatives, making for more compact components. As a result, a CO₂ system requires less refrigerant to run, saving you significant money both initially and annually.

Enhancing Energy Efficiency

Refrigeration accounts for 40% to 60% of supermarket energy consumption, according to the [U.S. Environmental Protection Agency \(EPA\)](#). CO₂ systems help offset high energy use by running more efficiently, saving money on monthly electric bills.

Protecting Systems and Users

Carbon dioxide is non-flammable and non-toxic, making it safer than most synthetics. It's classified as an A1 refrigerant, representing the least fire risk if leaked into the air. For comparison, ammonia falls into category B2L, labeled as mildly flammable but highly toxic.

What Are the Challenges of Switching to Low GWP Refrigerants?

As energy regulations, building codes, and safety standards change, suppliers and technicians are racing to keep up. Limited resources, supply chain issues, and lack of training all complicate processes for businesses needing to reach new standards quickly.

Short Timelines

Deadlines for installing low GWP systems are quickly approaching, set at January 1, 2025, for most field-charged systems and January 1, 2026, for variable refrigerant flow (VRF) systems. While the [EPA offers some allowances](#) to make the transition easier on businesses, the refrigeration and HVAC industries still need more well-trained, fast-acting technicians to make changes in time.

Untrained Technicians

Those trained in traditional equipment must adapt as demand for newer systems using lower GWP alternatives skyrockets. With little to no time to send technicians off for comprehensive training, service providers may struggle to balance the need for a consistent work schedule with old skills and knowledge becoming obsolete.

How Can Technicians and Businesses Adapt?

Supermarket and convenience store owners still needing to plan changes to low GWP systems find themselves in a similar place as refrigeration and HVAC technicians needing to gain in-demand skills. An emphasis on tackling training, keeping abreast of updates, and making long-term plans will help both groups move forward more quickly.

Invest in Training

Engineers and technicians must upskill to safely and properly use lower GWP refrigerants in their everyday work. In-house training and virtual programs may serve as alternatives for companies without the capital or time allowance to send their technicians out for training.

Shadow a Specialist

Gaining real-world experience under the advice and mentorship of low GWP refrigeration experts will accelerate technicians' ability to complete similar projects independently. Shadowing opportunities fast-track the training process for those needing to incorporate new methods quickly to keep up with demand.

Stay Up to Date On New Developments

Technicians and end users should stay informed of the rapidly evolving industry regulations. The sooner each group has and understands newly available knowledge, the sooner they can apply it to their action plans.

Plan Changes in Advance To Avoid Noncompliance

All involved should create plans quickly to align with new regulations and deadlines. Technicians and HVACR companies should consider training and educational programs immediately to get ahead of upcoming changes. For companies, leaving as much room to spare as possible before a transition deadline provides allowances for any headaches or holdups along the way.

Working Toward a More Sustainable Future in Refrigeration

The Arcticom Group (TAG) is an HVACR leader with experts equipped to design, install, and service the latest industry developments. Our significant investment in training includes a state-of-the-art CO₂ training facility in southern California. We're constantly catering to our technicians' development, keeping their skills up to date as our customers' needs change.

Our ever-expanding team of operating companies serves large-scale businesses across industries – cold storage, distribution, retail, supermarket, convenience, restaurant, and more. Our team will exceed your expectations whether you need a completely new system, a regular maintenance program, repairs, or retrofits. [Reach out to learn how.](#)



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